MODELLING THE DEMAND FOR LIFE INSURANCE IN MALAYSIA

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ABSTRACT

This study is undertaken to better understand the relationship between life insurance demand and macroeconomic factors by cointegration analysis and ordinary least squares (OLS) estimation. The major findings of this study show that there is no equilibrium (long-term) relationship between life insurance demand (in terms of new sum insured, new annual premium, sum insured in force and annual premium in force) and the macroeconomic factors, namely GDP per capita, the discount rate of Treasury Bill, inflation and the level of financial development. However, inflation is found to be significantly positively associated with life insurance demand by new sum insured. The latter finding possibly suggests that Malaysians tend to purchase a bigger amount (nominal value) of life insurance as a bequeath to their beneficiaries in an inflationary environment in order to maintain their purchasing power for the untimely death of the insured persons.

Kajian ini dijalankan untuk memahami dengan lebih mendalam mengenai perhubungan antara permintaan terhadap insurans hayat dan faktor makro ekonomi dengan menggunakan analisis kointegrasi dan ordinary least squares (OLS). Hasil kajian utama menunjukkan tiada perhubungan keseimbangan (jangka panjang) antara permintaan terhadap insurans hayat (berdasarkan jumlah baru nilai diinsuranskan, jumlah baru premium tahunan, jumlah berkuat kuasa nilai diinsuranskan, jumlah berkuat kuasa premium tahunan) dan faktor makro ekonomi, iaitu KDNK per kapita, kadar diskaun Bil Perbendaharaan, inflasi dan tahap perkembangan kewangan. Namun begitu, hasil kajian juga menunjukkan inflasi mempunyai perhubungan positif signifikan dengan permintaan terhadap insurans hayat berdasarkan jumlah baru nilai diinsuranskan. Hasil kajian yang kedua mungkin mencadangkan bahawa rakyat Malaysia cenderung untuk membeli insurans hayat dengan nilai diinsuranskan (nilai nominal) yang lebih besar sebagai harta pusaka untuk waris mereka dalam keadaan inflasi tinggi untuk cuba mengekalkan kuasa beli waris jika orang yang diinsuranskan meninggal dunia dengan tidak dijangka.

TABLE OF CONTENTS

1.0 INTRODUCTION

The insurance industry in Malaysia has grown to become an important sector as a part of the general development in financial services. Insurance industry is a key component of the Malaysian economy by virtue of the amount of premium it collects, the scale of its investment and, more fundamentally, the primary functions it provides to individuals and businesses with coverage against specified contingencies. The demand for life insurance in Malaysia has grown quite rapidly over a period of 40-year since 1970. The number of life insurance policies in force grew from 245,703 in 1970 to 11,850,981 in 2009 being a compound annual growth rate of 10.17% (The Treasury, 1976; BNM, 2010). The total amounts of sum insured (the face value of life policies) and annual premium for life insurance in force have grown far more rapidly than that of the number of policies. The sum insured in force and annual premium in force have been growing at the compound annual rates of 16.92% (1970: RM1,570.1 million; 2009: RM818,182.7 million) and 14.67% (1970: RM72.7 million; 2009: RM17,369.1 million) respectively (The Treasury, 1976; BNM, 2010).

A review of literature reveals that past empirical studies have identified economic, demographic and social-cultural factors to be among the factors that determine the level of demand for life insurance in a country. Those past studies that examined the various factors that affect life insurance demand used various methods of analysis such as the ordinary least squares (OLS) estimation in their empirical studies. However, no past studies have conducted a cointegration analysis that is able to examine the potential

equilibrium relationship between economic, demographic and social-cultural factors and life insurance demand, and also their short-term adjustment mechanisms towards equilibrium.

Thus, this study is undertaken to perform a cointegration analysis on life insurance demand besides the OLS estimation to examine the static long-term relationship between life insurance demand and macroeconomic factors. In performing a cointegration analysis on life insurance demand in this study, two different methods are used to examine the potential equilibrium relationship between life insurance demand and macroeconomic factors, and their short-term adjustment mechanisms towards equilibrium:

(a) the Engle-Granger Test and Error Correction Model (Engle and Granger, 1987); and

(b) the Bounds Test (Pesaran and Pesaran, 1997; Pesaran, Shin and Smith, 2001).

2.0 LITERATURE REVIEW

A number of empirical studies have been conducted to examine life insurance demand and its relationship with economic, demographic and social cultural factors.

Cargill and Troxel (1979) investigated the relationship between life insurance demand (as a form of savings) and macroeconomic factors namely income, inflation and interest rate, in US and UK over a 20-year period from 1954 to 1974. The major findings of their study are summarised below:

(a) Disposable personal income has a significant direct relationship with life insurance demand.

(b) Findings are inconclusive for the relationship between anticipated inflation and life insurance demand.

(c) The competing yields on alternative savings products such as savings deposits, savings certificates, government bonds and high-grade corporate bonds tend to relate negatively to life insurance demand.

Babbel (1981) conducted a time series study on the impact of anticipated inflation and expected income level upon the demand for conventional term insurance (as a form of protection) and for indexed term insurance (as a form of protection) in Brazil. The empirical findings of Babbel's study reveal that anticipated inflation and expected income level have significant negative and positive relationships respectively with the demand for conventional term insurance. For indexed term insurance, Babbel's findings are also similar to those for conventional term insurance. The findings on income, in which income is found to positively associate with the demand for indexed term insurance, are in line with theory. However, the findings on inflation, in which inflation is found to negatively associate with the demand for both the conventional and indexed term insurance, indicate that the introduction of indexing to the Brazilian insurance industry has not been successful in achieving the aim of offsetting the adverse effect of inflation on the demand for indexed term insurance (which is supposed to be inflation insensitive).

In another study, Babbel (1985) examined the impact of the price of insurance and income on the demand for whole life insurance in US covering the period from 1953 to 1979. Babbel's findings reveal that the price of insurance is related negatively and income is related positively to the demand for whole life insurance.

Dar and Dodds (1989) studied the demand for endowment insurance (as a form of savings) written by British life insurers from 1952 to 1985. They examined the interest rate hypothesis, the emergency fund hypothesis and also the effect of inflation on the demand for endowment insurance. Their findings reveal the following:

(a) The interest rate hypothesis is substantiated. Alternative rates of return are found to be negatively and statistically significant.

(b) Their findings do not support the emergency fund hypothesis. The emergency fund variable (i.e. unemployment) is statistically insignificant.

(c) Inflation does not appear to have any important relationship with the demand for endowment insurance.

Truett and Truett (1990) conducted a comparative study to examine the factors that affect life insurance demand in Mexico and US. Their findings show that education and the income level of the population in both countries, and the age distribution of the population in US only are found to relate positively and significantly to the demand for life insurance.

Browne and Kim (1993) examined the factors that influence the demand for life insurance across 45 countries. Their major findings reveal the following:

(a) The number of dependants has a direct and significant relationship with the demand for life insurance.

(b) Government spending on social security is related positively and significantly to the demand for life insurance.

(c) Countries where Islam is a predominant religion tend to have a lower level of the demand for life insurance.

(d) National income has a positive and significant relationship with the demand for life insurance.

(e) Inflation has a negative and significant relationship with the demand for life insurance.

(f) The price of insurance is related negatively to the demand for life insurance.

(g) The probability of death is found to be an insignificant factor affecting the demand for life insurance.

(h) There are no conclusive findings on whether education affects life insurance demand.

Outreville (1996) examined 48 developing countries to investigate empirically the relationship between the demand for life insurance and the level of financial development and insurance market structure. Outreville's findings indicate the following: income is significantly positive, inflation is significantly negative whilst interest rate is insignificant. The actuarially fair price of life insurance has an indirect relationship with

the demand for life insurance. On the other hand, the level of financial development has a direct relationship and the monopolistic market structure has an indirect relationship with the demand for life insurance.

Hau (2000) used Tobit regression to examine the relationship between demographic and wealth variables and the demand for life insurance by retired singles in US. Their major findings reveal that financial and wealth factors are more important compared with demographic and personal characteristics in explaining the demand for life insurance (a financial asset) of retired people. Hau's findings indicate that retired people who have higher net worth and less net liquid conventional asset tend to own more life insurance. In contrast, Hau's findings show that it is unclear whether age, education, the presence of children and gender affect life insurance demand of retired people.

Rubayah and Zaidi (2000) examined the relationship of seven macroeconomic factors with life insurance demand in Malaysia for the period 1971-1997. The major findings of their study are summarised below:

(a) GDP and income tax exemption are related positively to the demand for life insurance.

(b) Personal savings rate and short-term interest rate are related negatively to life insurance demand.

(c) Income per capita, current interest rate and inflation appear not to have an important relationship with life insurance demand.

Hwang and Greenford (2005) investigated the consumption of life insurance in three Chinese territories, namely mainland China, Hong Kong and Taiwan, to examine its relationship with economic, social and demographic changes. Their research findings show that the consumption of life insurance is significantly related to income (positively), social structure (negatively), education (positively), the implementation of one-child policy (negatively) and economic development (positively). However, their findings show no evidence for price and social security to have an effect on life insurance consumption.

Li, Moshirian, Nguyen and Wee (2007) conducted an analysis to identify the determinants of life insurance demand in 30 OECD countries over a period from 1993 through 2000. The model that considers both the social economic and product market factors jointly can best explain life insurance demand as compared with the other two models in which each considers either social economic factors only or product market factors only. The model that considers both the social economic and product market factors jointly is not only having the highest adjusted R^2, all the nine factors of social economic characteristics and product market conditions examined in the model are found to have a significant relationship with life insurance demand: (a) income (positive), (b) life expectancy (negative), (c) number of dependants (positive), (d) education (positive), (e) social security expenditure (negative), (f) financial development (positive), (g) foreign market share (positive), (h) inflation (negative) and (i) real interest rate (negative).

The major findings of past studies are summarised in Table 1.

Table 1
Summary of Major Findings from Past Studies on Life Insurance Demand

No.	Author	Variable	Finding
1	Cargill and Troxel (1979)	Income	(+, sig)
		Inflation	(Inconclusive)
		Interest rate	(–, sig)
2	Babbel (1981)	Inflation	(–, sig)
		Income	(+, sig)
3	Babbel (1985)	Price of insurance	(–, sig)
		Income	(+, sig)
4	Dar and Dodds (1989)	Interest rate	(–, sig)
		Unemployment	(n.s.)
		Inflation	(n.s.)
5	Truett and Truett (1990)	Education	(+, sig)
		Income	(+, sig)
		Age	(+, sig)
6	Browne and Kim (1993)	Number of dependents	(+, sig)
		Government spending on social security	(+, sig)
		Islamic country	(–, sig)
		Income	(+, sig)
		Inflation	(–, sig)
		Price of insurance	(–, sig)
		Probability of death	(n.s.)
		Education	(Inconclusive)
7	Outreville (1996)	Income	(+, sig)
		Inflation	(–, sig)
		Interest rate	(n.s.)
		Price of insurance	(–, sig)
		Level of financial development	(+, sig)
		Monopolistic market structure	(–, sig)
8	Hau (2000)	Net worth	(+, sig)
		Net liquid conventional asset	(–, sig)
		Age	(Inconclusive)
		Education	(Inconclusive)
		Presence of children	(Inconclusive)
		Gender	(Inconclusive)
9	Rubayah and Zaidi (2000)	GDP	(+, sig)
		Income tax exemption	(+, sig)
		Personal savings rate	(–, sig)
		Short-term interest rate	(–, sig)
		Income per capita	(n.s.)
		Current interest rate	(n.s.)
		Inflation	(n.s.)
10	Hwang and Greenford (2005)	Income	(+, sig)
		Social structure	(–, sig)
		Education	(+, sig)
		One-child policy	(–, sig)
		Economic development	(+, sig)
		Price of insurance	(n.s.)
		Social security	(n.s.)
11	Li, Moshirian, Nguyen and Wee (2007)	Income	(+, sig)
		Life expectancy	(–, sig)
		Number of dependants	(+, sig)
		Education	(+, sig)
		Social security expenditure	(–, sig)
		Financial development	(+, sig)
		Foreign market share	(+, sig)
		Inflation	(–, sig)
		Real interest rate	(–, sig)

The discussions above suggest that the many studies conducted in the past have produced results that sometimes are conflicting with one another. The conflicting results have led to a confused picture as to which factors have important relationship with the demand for life insurance. Therefore, in this study, an examination is performed in the context of Malaysia in trying to investigate its life insurance demand with focus on its relationship with macroeconomic factors only. Four macroeconomic factors, namely income, interest rate, inflation and the level of financial development, which are commonly examined in past studies are included in this current study. (Refer to Table 2 for a summary of findings from past studies on the relationship between life insurance demand and these four macroeconomic factors.) In this study, the relationship between life insurance demand and macroeconomics factors are being investigated not only using an OLS estimation in examining their static long-term relationship, a different approach is also adopted in examining their equilibrium relationship and their short-term adjustment mechanisms towards equilibrium based on a cointegration analysis.

Table 2
Summary of Major Findings from Past Studies on the Relationship between Life Insurance Demand and Macroeconomic Factors of Income, Interest Rate, Inflation and Financial Development

No.		Income	Interest Rate	Inflation	Financial Development
1	Cargill and Troxel (1979)	+, sig	–, sig	Inconclusive	
2	Babbel (1981)	+, sig		–, sig	
3	Babbel (1985)	+, sig			
4	Dar and Dodds (1989)		–, sig	n.s.	
5	Truett and Truett (1990)	+, sig			
6	Browne and Kim (1993)	+, sig	–, sig		
7	Outreville (1996)	+, sig	(–, sig)	n.s.	+, sig
8	Rubayah and Zaidi (2000)	Either (+, sig) or (n.s.)	Either (–, sig) or (n.s.)	n.s.	
9	Hwang and Greenford (2005)	+, sig			+, sig
10	Li, Moshirian, Nguyen and Wee (2007)	+, sig	–, sig	–, sig	+, sig

3.0 RESEARCH OBJECTIVES

This study is undertaken to examine the relationship between life insurance demand and macroeconomic factors.

Specifically, the main objectives of this study are as follows:

(a) (i) to examine whether life insurance demand by new sum insured is cointegrated with income, interest rate, inflation and the level of financial development;

(ii) when cointegration exists, to examine their short-term adjustment mechanisms towards equilibrium;

(iii) when cointegration does not exist, to examine their static long-run relationship;

(b) (i) to examine whether life insurance demand by new annual premium is cointegrated with income, interest rate, inflation and the level of financial development;

(ii) when cointegration exists, to examine their short-term adjustment mechanisms towards equilibrium;

(iii) when cointegration does not exist, to examine their static long-run relationship;

(c) (i) to examine whether life insurance demand by sum insured in force is cointegrated with income, interest rate, inflation and the level of financial development;

(ii) when cointegration exists, to examine their short-term adjustment mechanisms towards equilibrium;

(iii) when cointegration does not exist, to examine their static long-run relationship;

(d) (i) to examine whether life insurance demand by annual premium in force is cointegrated with income, interest rate, inflation and the level of financial development;

(ii) when cointegration exists, to examine their short-term adjustment mechanisms towards equilibrium; and

(iii) when cointegration does not exist, to examine their static long-run relationship.

4.0 RESEARCH METHODOLOGY

4.1 Methods of Analysis

This study examined the relationship between life insurance demand and macroeconomic factors through an OLS estimation. Besides that this study also conducted a cointegration analysis on life insurance demand using two different approaches, namely the Engle-Granger Test and Error Correction Model, and the Bounds Test.

Engle-Granger Test and Error Correction Model. With the presence of a group of variables that have a unit root, the Engle-Granger test is used to determine whether these variables are cointegrated.

In particular, the test for cointegration involves the following steps:

Step-1: Run the preliminary regression model of Y (the dependent variable that has a unit root) on X (the explanatory variable that has a unit root), i.e. $Y_t=\alpha+\beta X_t+e_t$, and save the residuals, i.e. $e_t=Y_t-\alpha-\beta X_t$.

Step-2: Perform a unit root test on the residuals (without including a deterministic trend in the Dickey-Fuller regression) in their original (non-differenced) series but in a re-parameterised format where the dependent variable is expressed as a first-differenced series, i.e. $\Delta e_t=\alpha+\rho e_{t-1}+v_t$ (where v_t is the error term). The deterministic trend is not included so that the residuals stay small and do not grow too large over time. Hence, the model returns to equilibrium.

Step-3: If the non-stationarity hypothesis is rejected (i.e. the residuals are stationary), conclude that Y and X are cointegrated and there is an equilibrium relationship between them. If the non-stationarity hypothesis cannot be rejected (i.e. the residuals are non-stationary), conclude that cointegration does not exist and there is no equilibrium relationship between Y and X.

If cointegration is present between Y and X, the Granger Representation Theorem states that their relationship can be expressed as an Error Correction Model (ECM) that contains important economic information as shown below:

$$\Delta Y_t = \varphi + \lambda e_{t-1} + \omega \Delta X_t + \varepsilon_t$$

Where

ΔY_t = the dependent variable

ΔX_t = the explanatory variable

e_{t-1} = the equilibrium error term being the one-period lagged value of the residual from the cointegrating regression model

ε_t = the error term in ECM

φ = the constant

λ = the regression coefficient of equilibrium error term, which is the stability condition for an ECM and it is expected to be less than zero, $\lambda<0$

ω = the regression coefficient of explanatory variable

Bounds Test. Bounds Test can be used whether the regressors are I(0) or I(1) variables so that the unit root test can be skipped.

The underlying model of Bounds Test is an autoregressive distributed lag (ARDL) model:

$$Y_t = a_0 + \sum_{i=1}^{n} b_i Y_{t-i} + \sum_{j=1}^{m} \sum_{k=0}^{n} c_{j,k} X_{j,(t-k)} + e1_t$$

Bounds Test involves two stages:

Stept-1: Test the significance of the lagged levels of the variables in an ECM form of the underlying ARDL model:

$$DY_t = a_1 + \sum_{i=1}^{n} \beta_i DY_{t-i} + \sum_{j=1}^{m} \sum_{k=0}^{n} \delta_{j,k} DX_{j,(t-k)} + e2_t$$

Stept-2: Estimate the coefficients of the long-run and short-run relationships and make inferences about their values:

$$DY_t = a_2 + \sum_{i=1}^{n} \beta_i DY_{t-i} + \sum_{j=1}^{m} \sum_{k=0}^{n} \delta_{j,k} DX_{j,(t-k)} + \lambda Ecm_{t-1} + e3_t$$

$$Y_t = a_3 + \sum_{j=1}^{m} \omega_j X_j + e4_t$$

4.2 Data Set

The dependent variable is the demand for life insurance. Life insurance demand is defined in terms of new business and business in force measured by amount and by premium as below:

(a) new sum insured (LNEWA)

(b) new annual premium (LNEWP)

(c) sum insured in force (LFORCEA)

(d) annual premium in force (LFORCEP)

The insurance data are obtained from the Annual Reports of the Director General of Insurance (The Treasury, 1976-1978; Ministry of Finance, 1979-1988; BNM, 1989-2010). The data are at market price and in logarithmic transform in the analysis.

The explanatory variables are macroeconomic factors as below:

(a) income

(b) interest rate

(c) inflation

(d) the level of financial development

Income is hypothesised to relate positively to life insurance demand. In this study, the income variable refers to gross domestic product per capita (GDPPC). The data are obtained from the time series database of national accounts at the official website of the Department of Statistics (http://www.statistics.gov.my/portal/index.php?option=com_content&view=article&id=379&Itemid=109&lang=en). The data are at market price and in logarithmic transform in the analysis.

The interest rate of alternative investment is hypothesised to relate negatively to life insurance demand. In this study, the interest rate variable refers to the average discount rate on 12-month Treasury Bill (TB). The data are obtained from the monthly statistical bulletin database of interest rates for Treasury Bills at the official website of the central bank of Malaysia, Bank Negara Malaysia (BNM) (http://www.bnm.gov.my/files/publication/msb/2011/4/xls/2.4.xls).

Anticipated inflation is hypothesised to have a negative relationship with life insurance demand for savings. In this study, the inflation variable refers to annual inflation rates (INFLATION). Specifically, it is the percentage change in consumer price indices (CPIs).

The CPI data are obtained from the monthly statistical bulletin database of consumer price index at the official website of BNM (http://www.bnm.gov.my/files/publication/ msb/2011/4/xls/3.5.8.xls).

Financial development is hypothesised to relate positively to life insurance demand. In this study, the financial development variable refers to the complexity of financial structure (FD). The data on monetary aggregates, M1 and M2, are obtained from the monthly statistical bulletin database of monetary aggregates for M1 and M2 at the official website of BNM (http://www.bnm.gov.my/files/publication/msb/ 2011/4/xls/1.3.xls). The measurement used to proxy financial development in the analysis is the percentage calculated as the ratio of quasi-money (M2−M1) to broad money (M2).

4.3 Sample

The sample period is from 1966 to 2009. Initially, the last two periods (2008 and 2009) were reserved for forecasting purpose. Since there is no cointegrating relationship between life insurance demand and macroeconomic factors, the examination has been performed using full sample size.

5.0 RESEARCH FINDINGS

5.1 Engle-Granger Test and Error Correction Model

Testing for Stationarity. First, the time series variables are subject to the Dickey-Fuller unit root test to examine their stationarity property.

Initially, a constant and a linear trend are included in the Dickey-Fuller regression of the time series variable. If the result indicates that the trend is insignificant, the Dickey-Fuller regression of the time series variable is re-estimated with the inclusion of only a constant. The Dickey-Fuller unit root test is applied to the time series variables in their original (non-differenced) series but the parameters in the original series (i.e. $Y_t=\alpha+\beta t+\phi Y_{t-1}+e_t$) have been re-parameterised so that the dependent variable is expressed as a first-differenced series (i.e. $\Delta Y_t=\alpha+\beta t+\rho Y_{t-1}+e_t$).

The null hypothesis under the Dickey-Fuller unit root test is the time series is non-stationary. In particular, the test specification is $H_0:\rho=0$ against $H_1:\rho<0$. The significance level of 5% is adopted as a guide for decisions on hypotheses.

If the Dickey-Fuller test statistic is bigger than the critical value at 5%, the null hypothesis of non-stationarity is not rejected in favour of the one-sided alternative. As such it can be concluded that the time series variable is non-stationary. The non-stationary variable is to be subject to a further analysis in order to verify that it has a unit

root by applying the Dickey-Fuller unit root test again to this variable in their first-differenced series (but in a re-parameterised format where the dependent variable is expressed as a second-differenced series). The second round of the unit root test is necessary in order to ensure that the first-differenced series of the non-stationary variable is in fact stationary. Hence, it is an I(1) variable.

The summary results of the Dickey-Fuller unit root test for the time series variables in this study are displayed in Table 3.

Table 3
Summary Results of Dickey-Fuller Unit Root Test

Variable	n	Test Statistic	Critical Value at 5%	Stationary
LNEWA	43	-2.449099	-2.9303	No
LNEWP	43	-1.618745	-2.9303	No
LFORCEA	43	2.874311	-3.5162	No
LFORCEP	43	-2.115283	-2.9303	No
LGDPPC	43	-0.928169	-2.9303	No
TB	43	-1.876690	-2.9303	No
INFLATION	43	-3.777623	-2.9303	Yes
FD	43	-2.833148	-2.9303	No
DLNEWA	42	-6.280098	-3.5189	Yes
DLNEWP	42	-5.405984	-2.9320	Yes
DLFORCEA	42	-2.647070	-3.5189	No
DLFORCEP	42	-2.542949	-2.9320	No
DLGDPPC	42	-5.376446	-2.9320	Yes
DTB	42	-5.739727	-2.9320	Yes
DFD	42	-6.028277	-2.9320	Yes
DDLFORCEA	41	-6.690076	-2.9339	Yes
DDLFORCEP	41	-6.857434	-2.9339	Yes

The first part of the table shows the results for the time series variables in their original (non-differenced) series:

(a) For the variable of inflation (INFLATION), its Dickey-Fuller test statistic (-3.777623) is smaller (more negative) than the critical value at 5% (-2.9303). This time series variable is stationary. Hence, it is an I(0) variable.

(b) For other time series variables such as new life insurance by sum insured (LNEWA), new life insurance by annual premium (LNEWP), life insurance in force by sum insured (LFORCEA), life insurance in force by annual premium (LFORCEP), GDP per capita (LGDPPC), the discount rate of Treasury Bill (TB) and financial development (FD), their Dickey-Fuller test statistics are bigger than the critical values at 5%. These time series variables are non-stationary.

The non-stationary variables are subject to a further analysis to verify whether they have a unit root by applying the Dickey-Fuller unit root test again to these variables in their first-differenced series with a constant included in their respective Dickey-Fuller regressions (but in a re-parameterised format where the dependent variable is expressed as a second-differenced series). This is to examine whether the first-differenced series of these non-stationary variables are in fact stationary.

The second part of the table shows the results for the non-stationary time series variables in their first-differenced series:

(a) The first-differenced series of non-stationary variables of new life insurance by sum insured (DLNEWA), new life insurance by annual premium (DLNEWP), GDP per capita (DLGDPPC), the discount rate of Treasury Bill (DTB) and financial development (DFD) are stationary. Hence, they are I(1) variables.

(b) The first-differenced series of non-stationary variables of life insurance in force by sum insured (DLFORCEA) and life insurance in force by annual premium (DLFORCEP) are non-stationary.

Again, the non-stationary variables are subject to a further analysis to verify whether their second-differenced series are stationary by applying the Dickey-Fuller unit root test.

The last part of the table shows that the second-differenced series of non-stationary variables of life insurance in force by sum insured (DDLFORCEA) and life insurance in force by annual premium (DDLFORCEP) are stationary. Hence, they are I(2) variables.

In summary, the results of the Dickey-Fuller unit root tests in Table 3 show that:

(a) inflation (INFLATION) is an I(0) variable;

(b) new life insurance by sum insured (LNEWA), new life insurance by annual premium (LNEWP), GDP per capita (LGDPPC), the discount rate of Treasury Bill (TB) and financial development (FD) are I(1) variables; and

(c) life insurance in force by sum insured (LFORCEA) and life insurance in force by annual premium (LFORCEP) are I(2) variables.

Based on the above, the time series variables that have a unit root, namely new life insurance by sum insured (LNEWA), new life insurance by annual premium (LNEWP), GDP per capita (LGDPPC), the discount rate of Treasury Bill (TB) and financial development (FD) are being subjected to the cointegration analysis.

Testing for Cointegration. After identifying the time series variables that have a unit root, the Engle-Granger test is used to examine whether cointegration exists for the following:

(a) whether new life insurance by sum insured (LNEWA) is cointegrated with GDP per capita (LGDPPC), the discount rate of Treasury Bill (TB) and financial development (FD) [objective (a)(i)]; and

(b) whether new life insurance by annual premium (LNEWP) is cointegrated with GDP per capita (LGDPPC), the discount rate of Treasury Bill (TB) and financial development (FD) [objective (b)(i)].

First, the test for cointegration is performed to examine new life insurance by sum insured and macroeconomic factors [objective (a)(i)].

Stept-1: Run the preliminary regression model of new life insurance by sum insured on GDP per capita, the discount rate of Treasury Bill and financial development:

$$LNEWA_t = \alpha_1 + \beta_1 LGDPPC_t + \beta_2 TB_t + \beta_3 FD_t + RESID1_t$$

The results of initial estimation show that the discount rate of Treasury Bill (TB) is insignificant. This variable is removed and the regression model is re-estimated and its residuals (RESID2) are saved for further analysis:

$$LNEWA_t = \alpha_2 + \beta_4 LGDPPC_t + \beta_5 FD_t + RESID2_t$$

The results of the re-estimated regression model are shown in Table 4.

Table 4
Testing for Cointegration:
Regression Model for New Life Insurance by Sum Insured

Dependent Variable: LNEWA
Sample: 1966 2009
Included observations: 44

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.520935	0.446534	-19.08240	0.0000
LGDPPC	1.797578	0.129210	13.91208	0.0000
FD	3.721520	1.134214	3.281144	0.0022

R-squared	0.987384	Mean dependent var	9.288310
Adjusted R-squared	0.986737	S.D. dependent var	2.199912
S.E. of regression	0.253358	Akaike info criterion	0.160719
Sum squared resid	2.503412	Schwarz criterion	0.284838
Log likelihood	-0.375101	F-statistic	1526.099
Durbin-Watson stat	0.518331	Prob(F-statistic)	0.000000

Step-2: Perform a unit root test on the residuals (without including a deterministic trend in the Dickey-Fuller regression) in their original (non-differenced) series but in a re-parameterised format where the dependent variable is expressed as a first-differenced series:

$$\Delta RESID2_t = \alpha_3 + \rho_1 RESID2_{t-1} + e1_t \qquad \text{(where } e1_t \text{ is the error term)}$$

The results of the unit root test show that the Dickey-Fuller test statistic is -2.156517 while the critical value at 5% is -2.9339.

Step-3: The unit root test results indicate that the Dickey-Fuller test statistic (-2.156517) is bigger (less negative) than the critical value at 5% (-2.9339). The null hypothesis of non-stationarity cannot be rejected. The residuals (RESID2) are non-stationary. It can be concluded that cointegration does not exist and there is no equilibrium relationship between new life insurance by sum insured and the macroeconomic factors of GDP per capita and financial development.

Next, the test for cointegration is performed to examine new life insurance by annual premium and macroeconomic factors [objective (b)(i)].

Stept-1: Run the preliminary regression model of new life insurance by annual premium on GDP per capita, the discount rate of Treasury Bill and financial development:

$$LNEWP_t = \alpha_4 + \beta_6 LGDPPC_t + \beta_7 TB_t + \beta_8 FD_t + RESID3_t$$

The results of initial estimation show that financial development (FD) is insignificant. This variable is removed and the regression model is re-estimated and its residuals (RESID4) are saved for further analysis:

$$LNEWP_t = \alpha_5 + \beta_9 LGDPPC_t + \beta_{10} TB_t + RESID4_t$$

The results of the re-estimated regression model are shown in Table 5.

Table 5
Testing for Cointegration:
Regression Model for New Life Insurance by Annual Premium

Dependent Variable: LNEWP
Sample: 1966 2009
Included observations: 44

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-9.902381	0.401570	-24.65914	0.0000
LGDPPC	1.757507	0.039102	44.94674	0.0000
TB	0.071300	0.030016	2.375410	0.0225

R-squared	0.982194	Mean dependent var	5.412190
Adjusted R-squared	0.981281	S.D. dependent var	1.733073
S.E. of regression	0.237115	Akaike info criterion	0.028209
Sum squared resid	2.192723	Schwarz criterion	0.152328
Log likelihood	2.407620	F-statistic	1075.637
Durbin-Watson stat	0.486149	Prob(F-statistic)	0.000000

Step-2: Perform a unit root test on the residuals (without including a deterministic trend in the Dickey-Fuller regression) in their original (non-differenced) series but in a re-parameterised format where the dependent variable is expressed as a first-differenced series:

$\Delta RESID4_t = \alpha_6 + \rho_2 RESID4_{t-1} + e2_t$ (where $e2_t$ is the error term)

The results of the unit root test show that the Dickey-Fuller test statistic is -2.244219 while the critical value at 5% is -2.9339.

Step-3: The unit root test results indicate that the Dickey-Fuller test statistic (-2.244219) is bigger (less negative) than the critical value at 5% (-2.9339). The null hypothesis of non-stationarity cannot be rejected. The residuals (RESID4) are non-stationary. It can be concluded that cointegration does not exist and there is no equilibrium relationship between new life insurance by annual premium and the macroeconomic factors of GDP per capita and the discount rate of Treasury Bill.

The above cointegration results are for the purposes of examining the equilibrium relationship between life insurance demand by new business (measured by amount and by premium) and macroeconomic factors [objectives (a)(i) and (b)(i)] where all of the variables involved are I(1) variables. However, a cointegration analysis is not performed on life insurance demand by business in force (measured by amount and by premium) [objectives (c)(i) and (d)(i)]. This is because the dependent variables (LFORCEA and

LFORCEP) are I(2) variables, not I(1) variables, therefore not meeting the qualifying criterion.

Concluding Remark. From the results testing for cointegration using Engle-Granger Test shown above, a conclusive remark can be drawn: there is no equilibrium relationship between the demand for life insurance (in terms of new business and business in force measured by sum insured and annual premium) and macroeconomic factors namely GDP per capita, the discount rate of Treasury Bill, inflation and the level of financial development.

5.2 Bounds Test

Bounds Test involves two stages:

Step-1: Examine the existence of the long-run relationship between the variables under investigation by testing the significance of the lagged levels of the variables in the error correction form of the underlying ARDL model.

Step-2: Estimate the coefficients of the long-run relationship and make inferences about their values using the ARDL model.

To start off, it is to test the significance of the lagged levels of the variables in an error correction form of the underlying ARDL models for the following:

(a) $DLNEWA_t = a_1 + \beta_1 DLNEWA_{t-1} + \beta_2 DLGDPPC_{t-1} + \beta_3 DTB_{t-1} + \beta_4 DINFLATION_{t-1} + \beta_5 DFD_{t-1} + \delta_1 LNEWA_{t-1} + \delta_2 LGDPPC_{t-1} + \delta_3 TB_{t-1} + \delta_4 INFLATION_{t-1} + \delta_5 FD_{t-1} + e1_t$

(b) $DLNEWP_t = a_2 + \beta_6 DLNEWP_{t-1} + \beta_7 DLGDPPC_{t-1} + \beta_8 DTB_{t-1} + \beta_9 DINFLATION_{t-1} + \beta_{10} DFD_{t-1} + \delta_6 LNEWP_{t-1} + \delta_7 LGDPPC_{t-1} + \delta_8 TB_{t-1} + \delta_9 INFLATION_{t-1} + \delta_{10} FD_{t-1} + e2_t$

(c) $DLFORCEA_t = a_3 + \beta_{11} DLFORCEA_{t-1} + \beta_{12} DLGDPPC_{t-1} + \beta_{13} DTB_{t-1} + \beta_{14} DINFLATION_{t-1} + \beta_{15} DFD_{t-1} + \delta_{11} LFORCEA_{t-1} + \delta_{12} LGDPPC_{t-1} + \delta_{13} TB_{t-1} + \delta_{14} INFLATION_{t-1} + \delta_{15} FD_{t-1} + e3_t$

(d) $DLFORCEP_t = a_4 + \beta_{16} DLFORCEP_{t-1} + \beta_{17} DLGDPPC_{t-1} + \beta_{18} DTB_{t-1} + \beta_{19} DINFLATION_{t-1} + \beta_{20} DFD_{t-1} + \delta_{16} LFORCE_{t-1} + \delta_{17} LGDPPC_{t-1} + \delta_{18} TB_{t-1} + \delta_{19} INFLATION_{t-1} + \delta_{20} FD_{t-1} + e4_t$

The hypothesis to be tested is the null of non-existence of a long-run relationship. In particular, the test specification is H_0: $\delta_n=\delta_{n+1}=\delta_{n+2}= \delta_{n+3}=\delta_{n+4}=0$ (i.e. the coefficients of the lagged levels of the variables are jointly not significantly different from zero) against H_1: $\delta_n\neq0$, $\delta_{n+1}\neq0$, $\delta_{n+2}\neq0$, $\delta_{n+3}\neq0$, $\delta_{n+4}\neq0$. The significance level of 5% is adopted as a guide for decisions on hypotheses.

The relevant statistic is the F-statistic for the joint significant of the coefficients for δ. As the distribution of the F-statistic is non-standard, the F-statistic is to be compared against the critical values prepared by Pesaran and Pesaran (1997). Pesaran and Pesaran have tabulated the appropriate critical values for a different number of regressors and whether

the ARDL model contains an intercept and/or trend. Two sets of critical values are provided, one assuming all the variables in the ARDL model are I(1) and another one assuming all the variables are I(0). As such the table provides a band covering all the possible classifications of the variables into I(0) and I(1). If the F-statistic falls outside this band, the null hypothesis of non-existence of a long-run relationship is not rejected. A conclusion can be made that the variables do not have a long-run relationship.

Table 6 shows the results of testing for long-run relationship for the regression model of new life insurance by sum insured.

Table 6
Testing for Long-Run Relationship:
Regression Model for New Life Insurance by Sum Insured

Variable Addition Test (OLS case)

****

Dependent variable is DLNEWA
List of the variables added to the regression:
LNEWA(-1) LGDPPC(-1) TB(-1) INFLATION(-1) FD(-1)
38 observations used for estimation from 1972 to 2009

****

Regressor	Coefficient	Standard Error	T-Ratio [Prob]
INPT	-8.8177	6.2897	-1.4019 [.172]
DLNEWA(-1)	.081873	.19011	.43065 [.670]
DLGDPPC(-1)	2.1811	4.5144	.48315 [.633]
DTB(-1)	-.027632	.11919	-.23183 [.818]
DIFLATION(-1)	.0029519	.040826	.072305 [.943]
DFD(-1)	-1.1910	.73649	-1.6171 [.117]
LNEWA (-1)	-.27899	.12673	-2.2016 [.036]
LGDPPC(-1)	4.7067	2.9281	1.6074 [.120]
TB(-1)	.16687	.12862	1.2974 [.205]
INFLATION(-1)	-.025480	.062095	-.41034 [.685]
FD(-1)	.15499	.76694	.20208 [.841]

****

Joint test of zero restrictions on the coefficients of additional variables:
Lagrange Multiplier Statistic CHSQ(5) = 10.4809 [.063]
Likelihood Ratio Statistic CHSQ(5) = 12.2628 [.031]
F Statistic F(5, 27) = 2.0566 [.102]

****

The results show that the F-statistic is 2.0566. The critical values at 5% are in the band of 2.649 (lower bound) and 3.805 (upper bound). It is noted that the F-statistic falls outside the band specified, so the null hypothesis of non-existence of a long-run relationship cannot be rejected. A conclusion can be made that there is no long-run relationship between new life insurance by sum insured and the macroeconomic factors of GDP per capita, the discount rate of Treasury Bill, inflation and the level of financial development.

Table 7 shows the results of testing for long-run relationship for the regression model of new life insurance by annual premium.

Table 7
Testing for Long-Run Relationship:
Regression Model for New Life Insurance by Annual Premium

Variable Addition Test (OLS case)

****

Dependent variable is DLNEWP
List of the variables added to the regression:
LNEWP (-1) LGDPPC(-1) TB(-1) INFLATION(-1) FD(-1)
38 observations used for estimation from 1972 to 2009

****

Regressor	Coefficient	Standard Error	T-Ratio [Prob]
INPT	-4.9596	6.6479	-.74605 [.462]
DLNEWP(-1)	.036890	.19531	.18888 [.852]
DLGDPPC(-1)	.65655	3.9364	.16679 [.869]
DTB(-1)	.036071	.11192	.32229 [.750]
DINFLATION(-1)	.0081350	.041277	.19708 [.845]
DFD(-1)	-1.2009	.67428	-1.7810 [.086]
LNEWP (-1)	-.18033	.13402	-1.3456 [.190]
LGDPPC(-1)	2.4492	2.8597	.85644 [.399]
TB(-1)	.10440	.14122	.73930 [.466]
INFLATION(-1)	-.0053073	.063176	-.084009[.934]
FD(-1)	.017745	.85286	.020806 [.984]

****

Joint test of zero restrictions on the coefficients of additional variables:
Lagrange Multiplier Statistic CHSQ(5) = 7.2248 [.204]
Likelihood Ratio Statistic CHSQ(5) = 8.0134 [.155]
F Statistic F(5, 27) = 1.2677 [.306]

****

The results show that the F-statistic is 1.2677. The critical values at 5% are in the band of 2.649 (lower bound) and 3.805 (upper bound). It is noted that the F-statistic falls outside the band specified, so the null hypothesis of non-existence of a long-run relationship cannot be rejected. A conclusion can be made that there is no long-run relationship between new life insurance by annual premium and the macroeconomic factors of GDP per capita, the discount rate of Treasury Bill, inflation and the level of financial development.

Table 8 shows the results of testing for long-run relationship for the regression model of life insurance in force by sum insured.

Table 8
Testing for Long-Run Relationship:
Regression Model for Life Insurance In Force by Sum Insured

Variable Addition Test (OLS case)

Dependent variable is DLFORCEA
List of the variables added to the regression:
LFORCEA (-1) LGDPPC(-1) TB(-1) INFLATION(-1) FD(-1)
38 observations used for estimation from 1972 to 2009

Regressor	Coefficient	Standard Error	T-Ratio [Prob]
INPT	-1.1178	2.1783	-.51315 [.612]
DLFORCEA(-1)	.58306	.14089	4.1383 [.000]
DLGDPPC(-1)	.64867	1.4393	.45069 [.656]
DTB(-1)	.013151	.039584	.33223 [.742]
DINFLATION(-1)	-.5450E-3	.014820	-.036776[.971]
DFD(-1)	-.38653	.24999	-1.5462 [.134]
LFORCEA(-1)	-.063147	.046672	-1.3530 [.187]
LGDPPC(-1)	.77070	1.0487	.73493 [.469]
TB(-1)	.035938	.045468	.79039 [.436]
INFLATION(-1)	-.0015778	.021709	-.072678[.943]
FD(-1)	.16972	.25650	.66168 [.514]

Joint test of zero restrictions on the coefficients of additional variables:
Lagrange Multiplier Statistic CHSQ(5) = 9.2313 [.100]
Likelihood Ratio Statistic CHSQ(5) = 10.5753 [.060]
F Statistic F(5, 27) = 1.7327 [.161]

The results show that the F-statistic is 1.7327. The critical values at 5% are in the band of 2.649 (lower bound) and 3.805 (upper bound). It is noted that the F-statistic falls outside the band specified, so the null hypothesis of non-existence of a long-run relationship cannot be rejected. A conclusion can be made that there is no long-run relationship between life insurance in force by sum insured and the macroeconomic factors of GDP per capita, the discount rate of Treasury Bill, inflation and the level of financial development.

Table 9 shows the results of testing for long-run relationship for the regression model of life insurance in force by annual premium.

Table 9
Testing for Long-Run Relationship:
Regression Model for Life Insurance In Force by Annual Premium

Variable Addition Test (OLS case)

Dependent variable is DLFORCEP
List of the variables added to the regression:
LFORCEP (-1) LGDPPC(-1) TB(-1) INFLATION(-1) FD(-1)
38 observations used for estimation from 1972 to 2009

Regressor	Coefficient	Standard Error	T-Ratio [Prob]
INPT	-1.1083	2.3139	-.47900 [.636]
DLFORCEP(-1)	.52792	.15374	3.4339 [.002]
DLGDPPC(-1)	.38068	1.3596	.28000 [.782]
DTB(-1)	.015167	.036022	.42105 [.677]
DINFLATION(-1)	.0033773	.013388	.25227 [.803]
DFD(-1)	-.51223	.21870	-2.3422 [.027]
LFORCEP(-1)	-.042484	.043143	-.98474 [.333]
LGDPPC(-1)	.59042	1.0185	.57969 [.567]
TB(-1)	.027650	.041605	.66458 [.512]
INFLATION(-1)	-.0026842	.019220	-.13966 [.890]
FD(-1)	-.0017940	.30957	-.005795[.995]

Joint test of zero restrictions on the coefficients of additional variables:
Lagrange Multiplier Statistic CHSQ(5) = 6.5971 [.252]
Likelihood Ratio Statistic CHSQ(5) = 7.2461 [.203]
F Statistic F(5, 27) = 1.1344 [.366]

The results show that the F-statistic is 1.1344. The critical values at 5% are in the band of 2.649 (lower bound) and 3.805 (upper bound). It is noted that the F-statistic falls outside the band specified, so the null hypothesis of non-existence of a long-run relationship cannot be rejected. A conclusion can be made that there is no long-run relationship between life insurance in force by annual premium and the macroeconomic factors of GDP per capita, the discount rate of Treasury Bill, inflation and the level of financial development.

Concluding Remark. From the results of testing for long-run relationship using Bounds Test shown above, a conclusive remark can be drawn: there is no long-run relationship between the demand for life insurance (in terms of new business and business in force measured by sum insured and annual premium) and macroeconomic factors namely GDP per capita, the discount rate of Treasury Bill, inflation and the level of financial development.

5.3 Ornidary Least Squares Estimation

As the results from cointegration analysis show that cointegration does not exist and there is no equilibrium (long-term) relationship between the demand for life insurance and macroeconomic factors namely GDP per capita, the discount rate of Treasury Bill, inflation and the level of financial development, a decision was made to estimate the regression models using OLS estimation.

The first OLS estimation has been performed for the following regression model:

$$DLNEWA_t = \alpha_1 + \beta_1 DLGDPPC_t + \beta_2 DTB_t + \beta_3 INFlATION_t + \beta_4 DFD_t + e1_t$$

The results of initial estimation show that the income, interest rate and financial development variables are insignificant. These variables are removed and the regression model is re-estimated:

$$DLNEWA_t = \alpha_2 + \beta_5 INFlATION_t + e2_t$$

The results of the re-estimated regression model are shown in Table 10.

Table 10
OLS Estimation: Regression Model for New Life Insurance by Sum Insured

Dependent Variable: DLNEWA
Sample(adjusted): 1967 2009
Included observations: 43 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.113889	0.027237	4.181397	0.0001
INFLATION	0.013459	0.005762	2.335806	0.0245

R-squared	0.117444	Mean dependent var	0.162186
Adjusted R-squared	0.095919	S.D. dependent var	0.122273
S.E. of regression	0.116261	Akaike info criterion	-1.420559
Sum squared resid	0.554184	Schwarz criterion	-1.338643
Log likelihood	32.54202	F-statistic	5.455991
Durbin-Watson stat	1.870356	Prob(F-statistic)	0.024472

	Value	Prob
Normality Test	5.200403	0.074259
Serial Correlation LM Test	0.308381	0.736410
White Heteroskedasticity Test	0.254071	0.776879

The results indicate that there is a significant positive relationship between inflation and the demand for life insurance in terms of new business measured by sum insured.

The second OLS estimation has been performed for the following regression model:

$$DLNEWP_t = \alpha_3 + \beta_6 DLGDPPC_t + \beta_7 DTB_t + \beta_8 INFlATION_t + \beta_9 DFD_t + e3_t$$

The estimation results show that all the macroeconomic factors, i.e. the income, interest rate, inflation and financial development variables, are insignificant. The results indicate that there is no important relationship between the demand for life insurance in terms of new business measured by annual premium and the macroeconomic factors of GDP per capita, the discount rate of Treasury Bill, inflation and the level of financial development.

The third OLS estimation has been performed for the following regression model:

$$DDLFORCEA_t = \alpha_4 + \beta_{10} DLGDPPC_t + \beta_{11} DTB_t + \beta_{12} INFlATION_t + \beta_{13} DFD_t + e4_t$$

The estimation results show that all the macroeconomic factors, i.e. the income, interest rate, inflation and financial development variables, are insignificant. The results indicate that there is no important relationship between the demand for life insurance in terms of business in force measured by sum insured and the macroeconomic factors of GDP per capita, the discount rate of Treasury Bill, inflation and the level of financial development.

The last OLS estimation has been performed for the following regression model:

$$DDLFORCEP_t = \alpha_5 + \beta_{14} DLGDPPC_t + \beta_{15} DTB_t + \beta_{16} INFlATION_t + \beta_{17} DFD_t + e5_t$$

The results of initial estimation show that the income, interest rate and inflation variables are insignificant. These variables are removed and the regression model is re-estimated:

$$DDLFORCEP_t = \alpha_6 + \beta_{18}DFD_t + e6_t$$

The results of the re-estimated regression model are shown in Table 11.

Table 11
OLS Estimation: Regression Model for Life Insurance In Force by Annual Premium

Dependent Variable: DDLNFORCEP
Sample(adjusted): 1968 2009
Included observations: 42 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.004926	0.005757	0.855686	0.3973
DFD	-0.637891	0.273545	-2.331939	0.0248

R-squared	0.119678	Mean dependent var	-0.000238
Adjusted R-squared	0.097670	S.D. dependent var	0.036252
S.E. of regression	0.034436	Akaike info criterion	-3.852988
Sum squared resid	0.047433	Schwarz criterion	-3.770242
Log likelihood	82.91276	F-statistic	5.437941
Durbin-Watson stat	2.348466	Prob(F-statistic)	0.024825

	Value	Prob
Normality Test	7.199672	0.027328
Serial Correlation LM Test	1.163006	0.323421
White Heteroskedasticity Test	0.059623	0.942205

The results (not in line with theory) indicate that there is a significant negative relationship between the level of financial development and the demand for life insurance in terms of business in force measured by annual premium. However, a close inspection at the mis-specification tests reveals that the normality test results (Jarque Bera value = 7.199672; Prob = 0.027328) have implicated that the residuals of the regression model are not normally and independently distributed. Therefore, the OLS estimators in the regression model do not have the desirable statistical properties of consistency, unbiasedness and minimum variance.

Concluding Remark. From the results of OLS estimation shown above, a conclusive remark can be drawn: when the demand for life insurance is defined by new sum insured, life insurance demand has a significant positive relationship with inflation.

6.0 CONCLUSIONS

The major finding of this study is that there is no equilibrium (long-term) relationship between the demand for life insurance and macroeconomic factors namely GDP per capita, the discount rate of Treasury Bill, inflation and the level of financial development. However, based on OLS estimation, inflation is found to be significantly positively associated with life insurance demand by new sum insured. This finding is not in line with the findings of Dar and Dodds (1989) and Rubayah and Zaidi (2000) which indicate that inflation does not have an important relationship with life insurance demand. Further, this finding also does not support the findings of Babbel (1981), Brown and Kim (1993) and Outreville (1996) who have found inflation to be significantly negatively related to life insurance demand.

The finding of inflation to be significantly positively associated with the amount of new life insurance could be explained such that Malaysians regard the purchase of life insurance mainly meant for the purpose of providing protection against the risk of pre-matured death, not as a savings instrument. Therefore, in an inflationary environment, Malaysians tend to purchase a bigger amount (nominal value) of life insurance as a

bequeath to their beneficiaries in order to maintain their purchasing power (to enable them to enjoy the same living standard) for the untimely death of the insured persons.

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